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internal endodermis in this family have not "intruded" through branch gaps. The general conclusion is that the stele of the existing Osmundaceae is a "reduced amphiphloic siphonostele," and that it is consistent with JEFFREY'S theory of the origin of the siphonostele and the homology of the pith.—J. M. C.

Morphology of *Laminaria*.—A knowledge of the reproduction of *Laminaria* has long been a desideratum, and this has now been supplied to some extent by DREW,³⁴ who has succeeded in making cultures according to methods he describes. He has concluded that the "sporangia" described as imbedded in the reproductive areas are in reality gametangia. These gametangia produce gametes (heretofore thought to be zoospores) which conjugate and produce zygospores. The zygospores give rise to a chain or mass of cells which may represent the $2x$ generation; and this in turn gives rise to the *Laminaria* plant, which represents the x generation. The x and $2x$ conditions are inferences, as no cytological work was done; and the direct outgrowth of the young *Laminaria* plants from the "chain or mass of cells" would hardly suggest an intervening reduction division. However, the discovery that the reproductive areas consist of gametangia and paraphyses is of sufficient interest. The gametes when liberated seem to have no cilia, but soon develop them. The cells of the structure (chain or mass) produced by the zygospore "rupture, and their contents grow out to form the gametophyte." Details are given of the development of the various regions and tissues of the young plant.—J. M. C.

The ecology of *Zostera*.—OSTENFELD has given an interesting ecological account of *Zostera marina*, as seen in Denmark.³⁵ The structure and growth of the plant is first treated in detail, following which is an account of the necessary life conditions of the plant and the variations in diverse habitats. While *Zostera* requires salinity, it thrives where the percentage of salt is high (3.3 per cent), and also where it is very low (0.6 per cent). It occurs only in relatively quiet waters, and grows at greater depths in clear than in muddy waters, sometimes living at as great a depth as 11^m where the water is very transparent. The most important factor in determining its luxuriance appears to be the character of the bottom, plants on firm sand having short narrow leaves, whereas plants in mud have long broad leaves (sometimes more than 2^m in length). A detailed account of the distribution of *Zostera* in Danish waters is followed by a discussion of the *Zostera* vegetation as a habitat; many plants and animals live where a *Zostera* vegetation has become established, the plants themselves often being covered with many forms. Other flowering plants that grow with *Zostera* are briefly described.—H. C. COWLES.

³⁴ DREW, G. HAROLD, The reproduction and early development of *Laminaria digitata* and *Laminaria saccharina*. *Annals of Botany* 24:177-190. *pls. 14, 15.* 1910.

³⁵ OSTENFELD, C. H., On the ecology and distribution of the grass-wrack (*Zostera marina*) in Danish waters. From Report Danish Biological Station. pp. 62. *figs. 9.* Copenhagen. 1908.